



Partners in Education

LAWRENCE LIVERMORE NATIONAL LABORATORY



Teacher Professional Development Programs in Science and Technology

A Partner in Education

Lawrence Livermore National Laboratory (LLNL) is a premier research facility that conducts some of the nation's most innovative science. As part of the University of California (UC) and as a Department of Energy national laboratory, LLNL has long been committed to enhancing science and technology education. The Laboratory contributes to the quality of science teaching by providing professional development instruction for K-14 science educators. These programs take advantage of Livermore's world-class research staff and facilities and are built upon the its cutting-edge "Big Science." The connection to Lab research, when shared as a part of a teacher's classroom instruction, builds student interest in the study of science.

This brochure describes the wealth of teacher professional development programs offered by the UC-managed Livermore Lab. Many courses provide college credit through California State University Chico, UC Davis, or the University of San Diego. Most are held at LLNL or at nearby facilities in Livermore. Certain programs are also available at various locations in the Central Valley. Unless otherwise noted, programs are free of charge. In most cases, registration is required.

Standards Alignment

The programs offered by LLNL are aligned with Science Content Standards for California Public Schools and the California Standards for the Teaching Profession. This alignment allows teachers to use the materials and skills they acquire through Lab instruction to strengthen their classroom curriculum and maintain their own professional development plan.

Program Development Strategy

LLNL uses a team approach for program development. The team works collaboratively to create a quality product that will serve the needs of K-14 educators, as well as represent the science of the Laboratory. Team members include:

- LLNL scientists to provide the science expertise used to develop program content,
- UC science educators to oversee the program development and implementation,
- Science teachers, experienced in designing and presenting professional development instruction to other educators, to bring an understanding of best practices in teaching methods and requirements,

- Graphic designers to prepare materials engineered to enhance the quality of classroom instruction,
- A Program Evaluator to create assessment tools to evaluate the utility of the programs, and
- A Network Administrator to prepare Web materials to provide teachers and students with resources needed to make the best use of the programs.

Two Categories of Teacher Programs

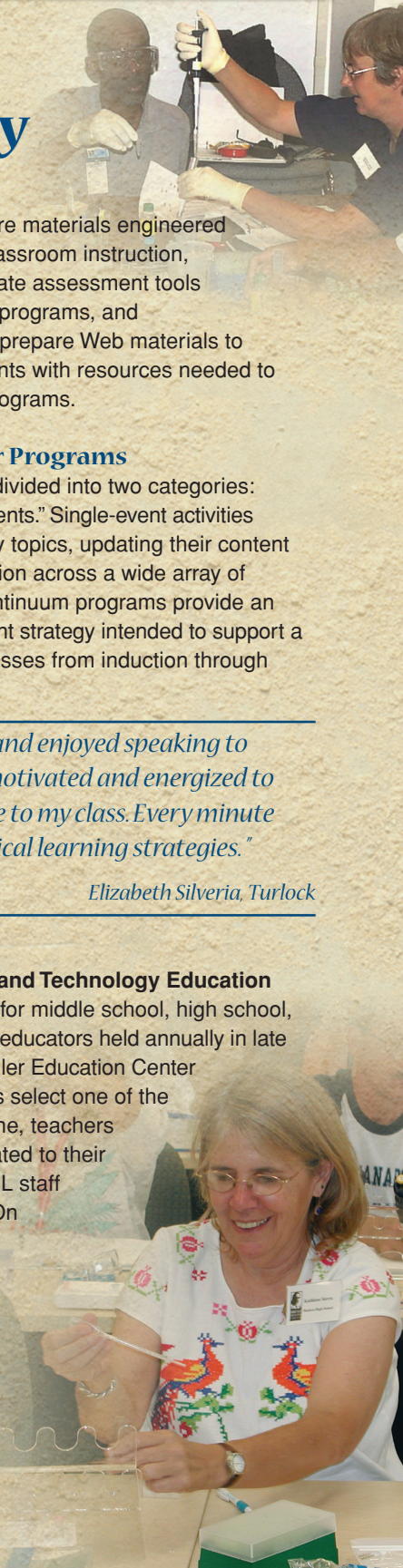
LLNL teacher programs are divided into two categories: "single event" and "continuum events." Single-event activities enable teachers to sample many topics, updating their content knowledge with current information across a wide array of cutting-edge science topics. Continuum programs provide an ongoing professional development strategy intended to support a teacher as his/her career progresses from induction through master teacher.

"I learned a great deal and enjoyed speaking to the scientists. I feel very motivated and energized to bring this new knowledge to my class. Every minute was packed with practical learning strategies."

Elizabeth Silveria, Turlock

Single Event Programs

The **Edward Teller Science and Technology Education Symposium** is a two-day event for middle school, high school, and community college science educators held annually in late September at the UC Edward Teller Education Center located on site at LLNL. Teachers select one of the several topics offered. On day one, teachers tour LLNL research facilities related to their chosen topic and meet with LLNL staff during "dinner with a scientist." On day two, teachers participate in three 90-minute hands-on workshops where they learn to use new teaching activities created by the scientist-teacher program development teams. Participants receive a complete set of the materials used in the





workshops, including color transparencies and a CD ROM for immediate classroom use. Participants may receive one semester unit of extension credit.

"This symposium has directly influenced my teaching practice and has improved my delivery of science content to my students. The Edward Teller Education Center has played an active and supportive role in the development of biotechnology education in our school district."

David Menshew, Modesto

Science on Saturday (SOS) is a one-hour science lesson presented to teachers and students by a LLNL scientist partnered with a science teacher. Each presentation has two components: fundamental science and an example of related "Big Science" conducted at LLNL. The fundamental science portion provides the background needed to understand the science featured in the presentation. "Big Science" illustrates how research performed at LLNL is used to solve real problems in the national interest. Teachers attending SOS are provided with a CD ROM containing the presentation for use in their classroom. A Web site provides additional teaching resources, including lessons related to the talk and opportunities to schedule a video conference with their students and a scientist. SOS lessons are held on consecutive Saturdays in February/March at the Amador Theater in Pleasanton and in the spring in the Central Valley. Attendance is on a first-come, first-seated basis.

Science Chat is a one-hour extension to the Science on Saturday lesson. Teachers — and students — can continue their Science on Saturday experience with an informal discussion with the SOS presenters. Participants can ask questions about science, how the scientists chose their career, or other topics of interest.

Computer Technology Workshops are a series of day-long classes to help teachers make better use of computer resources. Teachers select from topics that include: creating a Web site,

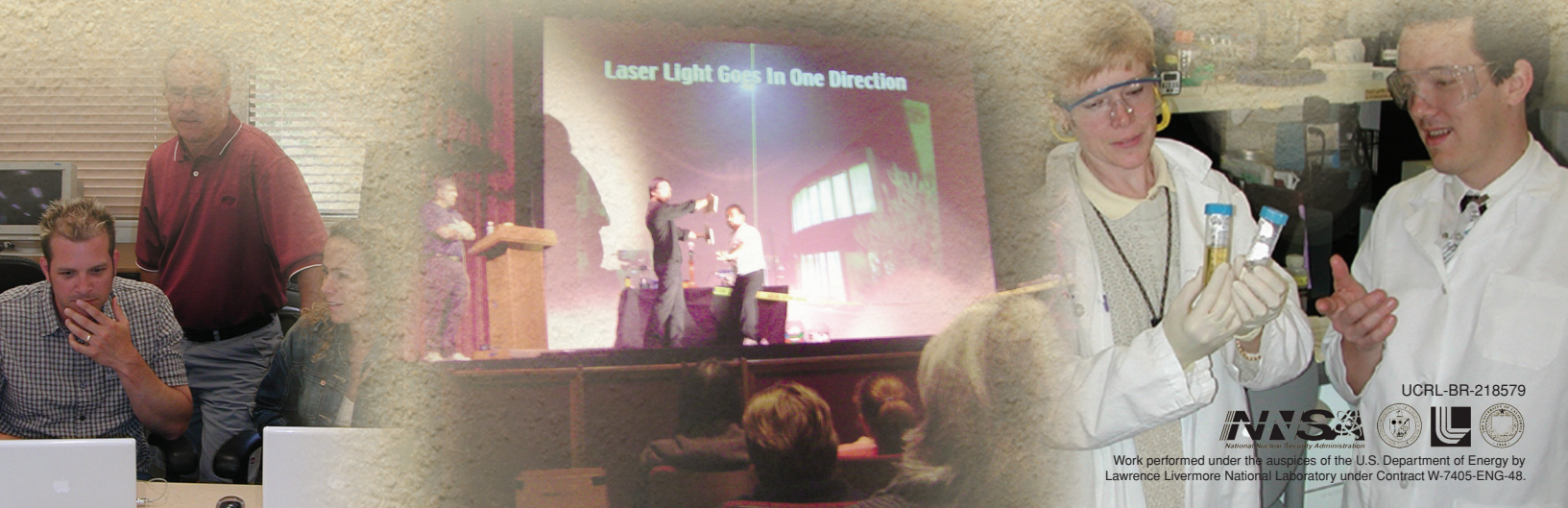
capturing video clips, and using multimedia tools such as video cameras and scanners. They can earn one semester credit by completing three separate day-long classes. The workshops are endorsed by the California Technology Assistance Project, Delta Sierra Region VI.

Continuum Event Programs

LLNL Teacher Research Academies offer K-14 science educators a unique experience in professional development, allowing them to grow from novice to master in a variety of scientific disciplines. Four academies, developed in collaboration with the UC and research conducted at LLNL, are currently available: Biotechnology, Energy and Environment, Biophotonics, and Fusion/Astrophysics. Each academy uses a four-tiered model and is aligned with California and National Science Standards. All four levels build upon knowledge and skills gained in the previous level. Level 1 (3-days) and Level 2 (5-days) provide content knowledge, skill development, and teaching strategies sufficient to prepare a teacher to meet the Science Content Standards for the chosen topic. Level 3 (5-days) introduces the teacher to research methods and advanced science skills essential to guiding students to conduct a research project. Level 4 (6-8 weeks) is a mentored research experience where the teacher conducts scientific research under the direction of a scientist. Upon completion of Level 4, the teacher is prepared to meet the Investigations and Experimentation Standards for the Science Content Standards for California Public Schools. All academies are offered during the summer at the Edward Teller Educational Center and at affiliated regional centers throughout California. Participants may receive university extension credit, which varies by academy.

Further Information

For additional information about LLNL teacher professional development programs, refer to the Lab's Education Web page (<http://www.llnl.gov/llnl/education/>) or contact Richard Farnsworth, LLNL Science & Technology Education Program, (925) 422-5059.



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